

CORRELATIONS OF SYMPTOMS OF DYSLLEXIA WITH ACADEMIC ACHIEVEMENT AND BEHAVIORAL PROBLEMS IN A MALAYSIAN PRIMARY SCHOOL

By

SHEILA DEVARAJ *

SAMSILAH ROSIAN **

SIDEK MOHD NOAH ***

RAHIL MAHYUDDIN ****

** Associate Professor, Faculty of Education Studies, UPM.

ABSTRACT

The purpose of this study is to determine whether there was any significant correlation between symptoms of dyslexia in Malaysian students and discipline problems. A total of 197 Standard 3 and 4 students from a national primary school were involved in the study. Findings show that there was a significant negative correlation between academic achievement and symptoms of dyslexia for both the Standard 3 ($r = -.60, p < .01$) and the Standard 4 ($r = -.67, p < .01$) students. The correlation also showed that the relationship between discipline problems and symptoms of dyslexia was higher for the older students. The Standard 3 students had $r = .39$, which is a definite but small relationship, while the Standard 4 students had $r = .49$, which is a substantial relationship. This might indicate a trend where the contribution of symptoms of dyslexia to discipline problems increases as the student progresses through the school system. In the analysis of variance, it was found that there was no significant difference in discipline problems and the occurrence of students with symptoms of dyslexia among the Malays, Chinese and Indians. However there was a difference in terms of the socio-economic status. A comparison was also made between the boys and girls and the findings showed that there was no significant difference in the total dyslexic score between the two sexes.

Keywords: Symptoms of Dyslexia, Academic Achievement, Behavioral Problems.

INTRODUCTION

Background

Currently in Malaysia, children with Learning Disabilities involving sight, hearing, late development, mental retardation, and physical problems receive help within the government education system. However, Specific Learning Disabilities (SLD) such as dyslexia or Asperger's Syndrome, are only now slowly being accepted by the Education Ministry. In the last five years, the Education Department has started remedial classes in some schools but these classes cater mainly to slow learners because in Malaysia, the term 'learning disability' (LD) is usually applied to children with mental retardation or 'slow learners'. While a slow learner is a child with limited intellectual capacity who would have an IQ of 70 and below, a dyslexic child has an average or above average IQ of 100 and above who needs patient tutoring by teachers who understand that dyslexic children learn differently (Morris, 2002).

In this study, the initial focus will be on identifying children with symptoms of dyslexia. The word 'dyslexia' is derived from the Greek; prefix 'dys' meaning 'difficulty' or 'malfunction' and the root-word 'lexis' meaning 'language'. The literal translation is 'difficulty with words' (Hornsby, 1995). It is not only a problem in reading, but includes spelling, writing and other aspects of language. Dyslexia may also affect a child's short term memory and concentration, and sometimes mathematics and personal organisational skills.

The problem of identification with dyslexia is complicated by the fact that the pattern of symptoms is individual to each person (Ott, 1997). Children who are mildly dyslexic will display only a few of the symptoms of dyslexia while the severely dyslexic child will display many of the symptoms of dyslexia. Teachers would need to be aware of these symptoms because they are the 'outward signs' of neurological damage or problems in the workings of the cognitive process. The dyslexic child has a normal

physique, takes part in games and does not appear to have many problems with speech, sight or hearing. For these reasons dyslexia has been referred to as a "hidden handicap" (Serfontein, 1990).

The theoretical framework of this study is based on Vygotsky's theory. Vygotsky emphasized the relation between language, learning and development (Bondurant-Utz, 2002; Schutz, 2002; Vygotsky, 1986; Vygotsky, 1978). Apart from being an efficient and convenient means for the transfer of information, the ability to use words is the single most important factor in the acquisition of concepts (Eliot, 1971). When the language component is not fully operational or not functioning properly, then learning and development will be affected. Three processes, phonological processing, syntactic awareness, and working memory are significantly disrupted in children who are dyslexic in English (Siegel, 1993).

Vygotsky emphasised that using language to think about thinking was required for the development of mature human consciousness (Schickedanz, Schickedanz, Forsyth & Forsyth, 1998; Wood, 1998). According to Vygotsky (1935) p. 353,

"Originally, for a child, speech represents a means of communication between people. . . . But gradually a child learns how to use speech to serve himself, his internal processes. Now, speech becomes not just a means of communication with other people, but also a means for the child's inner thinking process."

Thus dyslexic children, with language and speech problems will also face problems in the enhancement of their thought processes. The child will also face problems in social interaction with his peers (Rogers & Sawyers, 1988; Millar, 1968). This, coupled with poor cognitive development, will result in the dyslexic child being unable to cope in school. This inability to cope can lead to behavioural problems. Edwards (1994) carried out case studies on eight dyslexic boys who seemed to have survived their difficulties quite successfully. Edwards registered four totally unexpected experiences: 'violence from teachers', 'unfair treatment or discrimination',

'inadequate help or neglect' and 'humiliation'. It also highlights the facts that if teachers were initially trained at the induction stage how to recognise dyslexia and deal with it, a lot of the problems reported in the study by Edwards would not have occurred.

In a case study carried out in a primary school in Kuala Lumpur, Marinal (1998) concluded that among the factors influencing discipline problems in primary school is the learning problems faced by the student. The school authorities did not pay attention to the student's learning problems and this neglect led to continuous poor academic performance, which contributed to the undisciplined behaviour. It needs to be emphasised at this point that it is not that students with learning difficulties have criminal tendencies. It is rather that their inability to cope with our very academic education systems results in them exhibiting behaviour that gets them into trouble and labelled as discipline cases (Russel, Grandgenett & Licketeig, 1994; Hopkins, 1983; Hirchi & Hindelang, 1977).

According to the President of the Association of Dyslexia, Federal Territory, Malaysia, about 3% - 8% of children in Malaysia are dyslexic [The SUN, 2001]. This means that from a total of 62,85,781 students in Malaysian primary and secondary schools (Population and Housing Census of Malaysia, 2000), there are at least 3,14,000 children with dyslexia [NST, 2004]. Some, who are mildly dyslexic, can work out strategies to come. Others who come from families with a certain level of education and financial capacity will be able to identify their children's problem and get assistance from outside the school system. But, there unfortunately remains a large group of children whose parents probably have no idea that a condition such as 'dyslexia' even exists. More often than not the child's ability is under estimated and he is accused of being unmotivated or lazy by teachers who are unaware of the child's problem. This affects the child's morale and consequently may lead to emotional and behavioural problems where the child out of sheer frustration gets into problems in school and end up being labelled a trouble maker and classified as a discipline case (Thomson & Gilchrist, 1997; Twine, 1991; Gearheart & Gearheart, 1989; Dobson, 1985).

Research evidence shows that if the problem is detected early, structured, sequential teaching programs based on sound phonetic principles and multi-sensory techniques can be used to help these students (Morris, 2002; Hornsby & Shear, 1993; Ott, 1997). Research by Badian (1988) and Miles and Miles (1984) showed that when the diagnosis of dyslexia was made in the first two grades of school, over 80% of the students could be brought up to their normal classroom work. Early diagnosis also helps take away the burden of blame from the child, his parents and teachers (Raymond, 1997; Twine, 1991). If the problem is not detected, the difficulties accumulate and it takes much more time and effort for remediation (Singleton, 1996; Lyon, 1996). Once students start performing badly in school, they can get into a self-perpetuating chain of failure and frustration, which can result in greater secondary emotional and behavioural problems (Liow, 1997).

The results and findings of this study can be used to show the occurrence of symptoms of dyslexia as a specific learning disability faced by students in Malaysia. The establishment of the relationship between symptoms of dyslexia, low academic achievement and the occurrence of behavioural problems can draw the attention of the authorities to the special needs of these students within the Education System.

Specifically, the objectives are to:

- Identify students with symptoms of dyslexia in primary schools.
- Compare the difference in the academic achievement of students with symptoms of dyslexia and students without symptoms of dyslexia.
- Compare the difference in the occurrence of behavioural problems of students with symptoms of dyslexia and students without symptoms of dyslexia.
- Determine the relationship between symptoms of dyslexia and academic achievement.
- Determine the relationship between symptoms of dyslexia and behavioural problems.
- Establish a profile of students with symptoms of dyslexia based on the demographic variables

socio-economic status, sex, and race.

Methodology

The first part of the study is descriptive in nature. Using a ten-item screening test, the occurrence of the symptoms of dyslexia among primary school children in one national school was determined. One hundred and ninety seven Standard 3 and 4 students (aged 8 to 10 years) were chosen from S. K. Bukit Tinggi in the Klang District, using random cluster sampling. The screening instrument was administered by the researcher and took about thirty minutes per student. Most of the students were Indians (47.21%), followed by Malays (36.54%) and Chinese (7.61%). Seventeen students (8.63%) were from other races. There were 105 boys (53.30%) and 92 girls (46.70%). Once all the students had been screened, analysis of the data was carried out using the Independent sample *T*-test and the Pearson Product-Moment Correlation Coefficient (*r*), with α set at .05.

In this study the variables are mainly symptoms of dyslexia (Independent Variable), behavioural problems and academic achievement (Dependent Variables) and Socio-economic status (SES) of the student (Moderator Variable).

Instrumentation

The Screening Test

There are no existing survey instruments or diagnostic tools for dyslexia in Malaysia that could be employed for this research. The instrument of testing was developed partly based on the Dyslexia Screening Test (DST) produced by Fawcett and Nicolson from the University of Sheffield (1996). The original test is in English, and it has been adapted to the Malaysian Education System, using Bahasa Malaysia and local pictures. Written permission was obtained from The Psychological Corporation Europe. Certain tests have been omitted while the Syllable and Phoneme Identification Tests have been included.

1. Rapid naming

This test measures the time taken to name a series of pictures from line drawings. This serves as a diagnostic test because there is strong evidence that dyslexic children are slower than normal children to name pictures,

especially when given or shown one picture after another rapidly. It shows the ease of access to phonological representations of lexical items, which is a problem for dyslexic children who have difficulty with Rapid Automatised Naming (RAN) (Faust, Dimitrovsky & Shacht, 2003; Elbro, 1990; Fawcett & Nicolson, 1996).

2. *Bead Threading*

This serves as a diagnostic test because many dyslexic children are deficit in motor skills and may appear clumsy. They have problems with fine motor skills involving co-ordination of both hands and eyes (Fawcett & Nicolson, 1996).

3. *Hearing skills*

This serves as a diagnostic test because phonological recoding contributes to reading development. Phonological recoding refers to the use of systematic relationships between letters and phonemes. (Elbro, Borstrom & Peterson, 1998)

a) Syllable Identification

The student was presented with a single syllable spoken by the tester, while being shown 4 pictures. The student was then asked to choose the word beginning with that syllable. (Pointing or saying the correct response). E.g. syllable 'ba' - choose between pictures of a book ("buku" in the Malay Language), dice ("dadu"), a dress ("baju") and spoon ("sudu").

b) Phoneme Identification

The student was presented with a single initial phoneme spoken by the Tester, while being shown 4 pictures. The student was then asked to choose the word beginning with that phoneme, (pointing or saying the correct response). E.g. Phoneme 'p' choose between pictures of a book (buku), dice (dadu), a dress (baju) and vase (pasu).

4. *Postural Stability*

This test was used to verify the motor skill and balance of children. It is based on clinical procedures for establishing cerebella abnormalities. Since dyslexic children have slight abnormalities in their cerebellum where as their sense of balance will not be as good as other children

(Henley, Ramsey & Algozzine, 1999; Fawcett & Nicolson, 1996).

5. *Phonemic Segmentation*

Dyslexic children are usually delayed in acquiring the ability to detect rhymes and this can lead to difficulty in learning to read. 'Phonemic segmentation' ability, that is, the ability to split words into their constituent sounds, is a measure of this capacity (Demont & Gombert, 1996).

6.2 *minute spelling*

This quick spelling test was used to assess speed as well as accuracy of spelling. Even though Bahasa Malaysia is a very phonetic language, children with dyslexia will still make mistakes, especially if the words are given rapidly. This test also showed the problem that dyslexic children have with writing quickly.

7. *Backward Digit Span*

This test is a common component of IQ tests. Digit span would involve the children remembering the numbers in the correct order. However, the 'backward digit span' is usually more difficult for children with dyslexia.

8. *One minute writing*

This test examines the speed and accuracy of copying a short passage. One of the problems faced by dyslexic children is their slow speed at writing. This makes it difficult for them to copy from the blackboard. They also have difficulty in completing their work; this is a real disadvantage when sitting for examinations (ERIC Clearinghouse, 2000; Fawcett & Nicolson, 1996).

9. *Verbal Fluency*

This test is a test of verbal fluency and it is simply the number of words beginning with 's' the child can think of in one minute (Fawcett & Nicolson, 1996).

10. *Semantic Fluency*

This test should give different results for 'slow learners' and 'dyslexic children'. Though similar to the Verbal Fluency Test, there is evidence that dyslexic children perform much better relatively on this Semantic Fluency Test (Fawcett & Nicolson, 1996).

To create norms for the Standard 3 students, all the 110 Standard 3 students in S.K. Bukit Tinggi were tested using

the 10-item screening test. Four of the students were not included in the analysis as they had recently transferred from Sabah, E. Malaysia and could not understand Bahasa Malaysia. The scores for each screening test for the 106 Standard 3 students were ranked and percentile ranks developed. Low scores in the tests were used to indicate symptoms of dyslexia. The percentile scores were then collapsed into five categories, similar to the process used by Fawcett and Nicolson (1996) when developing the DST. The researcher then worked out the range of individual scores used for recoding the scores for each screening test. Using SPSS, the indicators of dyslexia were calculated for each test. The Standard 3 student's individual scores were then recoded. The overall measure of dyslexia was obtained from a total of all the test scores from the ten tests. A similar process was carried out to create norms for the Standard 4 students.

Findings and Discussion

The findings show that there was no significant difference in the total score for symptoms of dyslexia and academic achievement between the two sexes at .05 level of significance. It was earlier thought that the occurrence of dyslexia was more common among boys than girls, even up to a ratio of 4:1 (Cronin, 1997; Hornsby, 1995; Selikowitz, 1993). However, the results of this study are consistent with studies based on objective research testing that conclude that there is no difference in the occurrence of dyslexia among boys and girls (Gorman, 2003; Flynn & Rahbar, 1994; Shaywitz, Fletcher & Escobar, 1990).

There was also no significant difference among the Malay, Indian and Chinese students. However, the total score for symptoms of dyslexia was significantly different at .05 level of significance, among students who came from families with dissimilar socio-economic status

Socio Economic Status	N	Mean	SD
Upper	46	2.13	2.52
Middle	75	4.23	4.15
Lower	74	6.36	5.31
Total	195	4.54	4.62

Table 1. Means and standard deviation of symptoms of dyslexia in terms of economic status

(Table 1).

Previous research states that low-income status is recognised as a risk factor for reading failure (Khadijah & Zallizan, 1994; Khamis Maarof, 1984). Early weaknesses in phonological awareness, in letter knowledge and in vocabulary size are common for children with low SES and are associated with reading difficulties (Bowey, 1995). The results also show a significant difference in discipline problems based on the SES. This is consistent with studies carried out in Indiana University (Skiba, 2003), which show a connection between lower SES and indiscipline in urban schools. Studies done by the Ministry of Education show that indiscipline predominates in the urban poor and working-class groups (Rahimah & Norani, 1998). The dissimilarity in academic achievement among the three socio-economic groups is consistent with prior studies (Redd, Brooks & McGarvey, 2001; Webster & McConnel, 1987). Verma and Campbell (2003) explain this difference by the prominence of the socio-psychological environment and intellectual stimulation in the home, in influencing academic ability and achievement.

This research proceeds with comparing children with symptoms of dyslexia and those without such symptoms on academic achievement and behavioural problems (Table 2).

The Independent 't'-test showed that there was a significant difference ($t(50) = -8.13, p < .05$) in the level of academic achievement among students with symptoms of dyslexia ($M = 33.83, SD = 19.44$) and students without symptoms of dyslexia ($M = 69.69, SD = 19.43$). Further analysis of the data using the Pearson correlational analysis showed that there was a significant negative correlation ($p < .05$) between academic achievement and symptoms of dyslexia, both for the Standard 3

	N	Academic Achievement		Behavioural Problems	
		Mean	SD	Mean	SD
Children With Symptoms of Dyslexia	27	69.69	19.43	.93	1.107
Children With Symptoms of Dyslexia	25	33.83	19.44	3.24	1.091

Table 2. Comparison between children with symptoms of dyslexia and those without such symptoms on academic achievement and behavioural problems

students ($r(103) = -.603$) and the Standard 4 students ($r(89) = -.616$). The relationship between these two variables was substantial and clearly showed that students with more symptoms of dyslexia perform less well academically.

The coefficient of determination (r^2) shows that 36.3% of the variability in academic achievement is explained by the total score for symptoms of dyslexia for the Standard 3 students, while 37.9% of the variability in academic achievement is explained by the total score for the symptoms of dyslexia for the Standard 4 students. This is quite a strong linear relationship which can be explained by the developmental difficulties dyslexic children face in concentration, short term memory, perception, coordination and speech. The Hierarchy of Learning (Serfontein, 1990) states that learning is an ordered process by which new information is first registered, then categorized and lodged in the memory bank. The process is reversed when information is withdrawn and the idea expressed in speech, writing or body movement. It is obvious that any interference or dysfunction at any level will affect the whole process. Children with dyslexia who make fundamental errors of perception (reading 'tahun' as 'tuhan' or 'was' as 'saw') or have short-term memory problems will end up having gaps in their basic skills and consequently perform badly in school.

The Independent 't'-test also showed that there was a significant difference ($t(50) = 7.06, p < .05$) in the occurrence of behavioural problems among students with symptoms of dyslexia ($M=3.24, SD = 1.09$) and students without symptoms of dyslexia ($M= .93, SD= 1.11$). The Pearson correlational analysis was used to determine the strength of the relationship between symptoms of dyslexia and behavioural problems. For Standard 3 students there is a definite but small relationship ($r(104) = .387, p < .01$) between behavioural problems and symptoms of dyslexia, while for Standard 4 students, there is a substantial relationship ($r(89) = .489, p < .01$) between behavioural problems and symptoms of dyslexia (Table 3). This means that as the symptoms of dyslexia increase there are more behavioural problems. What is interesting to note is that the relationship between

	Pearson Correlation	Sig.
Standard 3 (N=105)	.387	.111
Standard 4 (N=91)	.489	.000

Table 3. The relationship between symptoms of dyslexia and behavioural problems for Standard 3 and Standard 4 Students

symptoms of dyslexia and behavioural problems showed an increase when comparing Standard 3 students to Standard 4 students. This suggests that as the students get older, their inability to cope academically has a bigger consequence on their behaviour in the classroom.

The coefficient of determination shows that 15.0% of the variability in discipline problems is explained by the total score of symptoms for dyslexia for the Standard 3 students, while 23.9% of the variability in discipline problems is explained by the total score of symptoms for dyslexia for the Standard 4 students. While these values are not in themselves very high, their increase from Standard 3 to Standard 4 students makes one wonder whether this contribution of learning disabilities to discipline problems will continue to increase as these students progress through our school system.

The findings support the belief that dyslexia will adversely affect student's achievement in academic settings, as well as result in the student having behavioural problems.

Conclusion

In conclusion, the findings provide preliminary evidence regarding the importance of recognizing, identifying and implementing appropriate remedial programs for students with dyslexia by revealing positive relationship between symptoms of dyslexia and the occurrence of behavioural problems.

Implications

Based on the findings and discussions, this study has a lot to offer. Current methods of curbing indiscipline in Malaysians schools involve systems such as the 'Demerit System', which is basically punishment for misbehaviour. The findings of this study show the correlation between behavioural problems, academic achievement and specific learning disabilities such as dyslexia. This implies that some of the students have behavioural problems because they cannot cope academically. And one of the reasons they cannot cope academically could be

because they are dyslexics. This clearly shows the interrelatedness of development (Pierce, 1995).

Students with dyslexia do not only have academic problems, but also have behavioural, social and affective problems. A student's low self-concept, poor motivation level, socially troublesome personality characteristics and sense of frustration are often a result of school failure. All this can easily result in delinquent behaviour (Unger, 1978).

The findings of this study showed an equal number of boys and girls with symptoms of dyslexia. This is consistent with studies that did not require teachers to identify the students with learning difficulties (Shaywitz, Fletcher & Escobar, 1990; Flynn & Rahbar, 1994). This implies that when studies on learning difficulties are carried out in the future, the researcher needs to keep in mind that referral bias can occur with more boys being identified because of their disruptive behaviour. In implementing both diagnostic and remedial programs in schools, the school authorities need to be aware that girls with learning difficulties tend to be under-identified (Vogel & Walsh, 1987).

One outcome of this research is that it highlights the need to have standardized reading and spelling tests in Malaysia, for all the different age levels; Standard 1 to Standard 6. This will enable the teachers to check on the progress (or lack of) being made by their students. Here one is faced with the practical problem of testing literacy accurately in a multilingual, multicultural society like Malaysia.

An alternative to the traditional screening test would be the use of computers. For instance the Cognitive Profiling System (CoPS 1) is a series of computer-based tests that takes forty-five minutes to administer and is suitable for assessing children aged between four and eight years (Ott, 1997). Many European countries have gone through the process of developing and using the traditional (paper and pencil) methods before progressing to computers that just require the child to play 'games'. Since Malaysia is just entering this whole field of 'specific learning disabilities', it would make sense if we use the

expertise from abroad and not try to 'reinvent the wheel'. However, interpretation of the results requires professional expertise and we also need to keep in mind the costs and the problem of accessibility for the rural schools.

Another practical implication of carrying out screening tests is that the education department has to face the question, "What is going to be done to help these children who show features of the dyslexia syndrome?" As very clearly stated by White Franklin, "A screening programme will make matters worse unless associated with a course of action" (as cited in Ott, 1997, p. 20).

Recommendations

Malaysia urgently needs education laws that ensure that all students receive a fair education. For example, the Education Act 1993 in England places upon the Local Education Authority the responsibility for identifying and assessing all children with special educational needs as early as possible (Ott, 1997; Singleton, 1996). The Act also specifies that the governing body must ensure that teachers in the school are aware of the importance of identifying and providing for those pupils with special educational needs.

A similar law in America (Public Law 94-142, the Education for All Handicapped Children Act) requires that all students with disabilities be given free, appropriate public education and provided the funding to help implement this education. In 1983, this law was renamed as Individuals with Disabilities Education Act (IDEA). The IDEA spells out broad mandates for services to all children with disabilities. These include evaluation and eligibility determination, appropriate education and an individualised education plan (IEP), and education in the least restrictive environment (LRE) (Martin, Martin & Sherman, 1996). As a country that is striving to achieve fully developed nation status, we have to make certain that all children, irrespective of race, religion, gender or capability, be given the right and capacity to develop and function to the best of their abilities.

Once the necessary legislation is in place, there needs to be a nationwide awareness programme, perhaps led by the universities interested in this field. The purpose might

be to create awareness, not only among the public but specifically to make the teaching profession aware of the existence of dyslexia and the role that they need to play so that these students get the necessary help in school. The Education Ministry will also need to take the initiative to train an adequate number of Educational Psychologists and teachers who are knowledgeable in the field of specific learning disabilities. This will help curb the escalating behavioural problems in schools. Appropriate intervention will also lessen the loss of potential from these students who are gifted in many ways but need to be taught by using structured, sequential teaching programs based on sound phonetic principles and with multi-sensory techniques.

Suggestions for further research

This study had a sample size of 197 students from one national primary school. Future studies should include more schools, preferably from the various states in Malaysia, both from the rural as well as the urban area, to make the findings more comprehensive and representative. A large sample size would encompass all the major ethnic groups too.

This study mainly focused on Standard 3 and 4 primary school students who were from the ages of eight to ten. It might be worth while to devise tests that can assess students at an even younger age. As has been stated earlier, the later the child is assessed, the longer remedial work is needed (Lyon, 1996, Singleton, 1996). In fact, certain countries, like Belgium, test all the preschool children (aged five) to ensure that the precious formative years are not wasted (Muskat, 1996).

Since Malaysia is a multiracial, multicultural society, future assessment tests need to also cater to the students from the vernacular schools. This means that the language of testing needs to be carried out in the student's mother tongue. The assessment test would also have to look into the cultural and socio-economic status of the students, especially as one of the findings of this test indicates that the students of Bajau origin had difficulty in performing the test.

This correlational study was undertaken at one point of

time and may yield results that may differ at another point of time. Furthermore, being a correlational study, it only identified the relationship between variables and did not reveal the cause and effect of each variable in terms of the others. Thus it is advocated that a longitudinal study might help researchers to observe more realistic and consistent results.

In view of the various limitations found in this study, the findings therefore cannot be over generalised. However in spite of all these shortcomings, it is hoped that this research can, contribute towards the creating of awareness regarding dyslexia in this country. One hopes that the diagnostic tool created for the purpose of this research, can be improved, enhanced or be used as a foundation for the creation of an assessment instrument that can be used in Malaysian schools.

References

- [1]. Badian, N. A. (1988). The prediction of good and poor reading before kindergarten entry: A nine year follow-up. In P. Ott, *How to Detect and Manage Dyslexia. A Reference and Resource Manual* (p. 24). London: Heinemann Educational Publishers.
- [2]. Bondurant-Utz, J. A. (2002). *Practical Guide to Assessing Infants and Preschoolers with Special Needs*. New-Jersey: Merrill Prentice Hall.
- [3]. Bowey, J. (1995). Socio-economic status difference in preschool phonological sensitivity and first-grade reading achievement. Retrieved June 27, 2003 from <http://www.greenwoodinstitute.org/roadmap/8other.ht>
- [4]. Cronin, E.M. (1997). *Helping Your Dyslexic Child*. Rocklin: Prima Publishing.
- [5]. Demont, E., & Gombert, J.E. (1996). Phonological awareness as a prediction of recoding skills and syntactic awareness as a predictor of comprehension skills. *British Journal of Educational Psychology*, 66, 315-332.
- [6]. Dobson, J. (1985). *The Strong-Willed Child*. Wheaton: Tyndale House Publishing.
- [7]. Edwards, J. (1994). *The Scars of Dyslexia. Eight Case Studies in Emotional Reactions*. London: Cassel.
- [8]. Elbro, C. (1990). Differences in dyslexia. A study of

reading strategies and deficits in a linguistic perspective. In C. Elbro, I. Borstrom & D. K. Peterson, (1998, Jan. Feb. Mac.), Predicting dyslexia from kindergarten: The importance of distinctness of phonological representations of lexical items. (p. 45). *Reading Research Quarterly*, 33(1), 36-60.

[9]. Elbro, C., Borstrom, I., & Peterson, D. K. (1998). Predicting dyslexia from kindergarten: The importance of distinctness of phonological representations of lexical items. *Reading Research Quarterly* 33(1), 36-60.

[10]. Eliot, J. (1971). *Human Development and Cognitive Processes*. New York: Holt, Rinehart & Winston.

[11]. ERIC Clearinghouse on Disabilities and Gifted Education (2000). *The Warning Signs of Learning Disabilities* (pp. 1-3). Retrieved February 16, 2002, from <http://reicec.org/digest/E603.html>

[12]. Faust, M., Dimitrovsky, L., & Shacht, T. (2003). Naming Difficulties in children with dyslexia. *Journal of Learning Difficulties* 36(3), 203-216.

[13]. Fawcett, A. J., & Nicolson, R. I. (1996). *Dyslexia Screening Test (DST) Manual*. London: The Psychological Corporation.

[14]. Flynn, J. M., & Rahbar, M. H. (1994). *Prevalence of reading failure in boys compared with girls*. Retrieved June 24, 2003, from <http://www.doe.tased.edu.au/equity/standard/s/gender/framework/learn3.htm>

[15]. Gearheart, B. R., & Gearheart, C. J. (1989). *Learning Disabilities: Educational Strategies*. (pp. 233-234). Ohio: Merrill Publishing.

[16]. Gorman, C. (2003, July). The New Science of Dyslexia. *Times* 162(4), 21-26.

[17]. Henley, M., Ramsey, R., & Algozzine, R. (1999). Characteristics and strategies for teaching students with mild disabilities. In W. Santrock, *Educational Psychology* (p. 207). New York: McGraw-Hill.

[18]. Hirchi, T., & Hindelang, M. J. (1977). Intelligence and Delinquency: A revisionist review. In J. R. Hopkins, *Adolescence. The Transitional Years* (p. 355). New York: Academic Press.

[19]. Hopkins, J. R. (1983). *Adolescence: The Transitional*

Years. New York: Academic Press.

[20]. Hornsby, B. (1995). *Overcoming Dyslexia*. London: Vermillion.

[21]. Hornsby, B., & Shear, F. (1993). *Alpha to Omega: The A-Z of Teaching, Reading, Writing and Spelling*. Oxford: Heinemann

[22]. Khadijah, R. M. Y., & Zalizan, M. J. (1994). *The study of Children with Special Needs within and outside the School System. Case Study: Screening for Dyslexia in Standard 2*. Retrieved June 27, 2003, from www.cikgu.net/download/dyslexia/dyslexia.ppt

[23]. Khamis, M. (1984). *Satu percubaan untuk mengukur kebolehan membaca murid-murid di peringkat darjah dua*. Universiti Malaya: Kuala Lumpur.

[24]. Liow, S. J. R. (1997). *Assessment and Treatment of Learning Disabilities: Recent Findings*. Paper presented at the Academy of Medicine's public seminar on Enhancing Children's Learning, Singapore. Retrieved August 25, 2002, from <http://web.singnet.com.sg/~liewping/local%20research.html>

[25]. Lyon, G. R. (1995). Towards a definition of dyslexia. In P. Ott, *How to Detect and Manage Dyslexia. A Reference and Resource Manual*. (p. 4). London: Heinemann Educational Publishers.

[26]. Lyon, G.R. (1996). Learning difficulties. Future of children. In W. Santrock, *Educational Psychology* (p. 209). New York: McGraw-Hill.

[27]. Marinal, H. (1998). *Salah laku di kalangan pelajar sekolah Rendah: Satu kajian kes*. Unpublished master's thesis, University Malaya, Kuala Lumpur.

[28]. Miles, T. R., & Miles, E. (1984). Teaching Needs of Seven Year Old Dyslexic Pupils. In P. Ott, *How to Detect and Manage Dyslexia. A Reference and Resource Manual* (p. 24). London: Heinemann Educational Publishers.

[29]. Millar, S. (1968). The psychology of play. In K. S. Ralph & E. A. Eddows, *Interactions for Development and Learning: Birth through eight years* (2nd ed., p. 113). Upper Saddle River: Pearson Education.

[30]. Morris, B. (2002). Overcoming Dyslexia. *Fortune Magazine* 145(10), 60 - 69.

- [31]. Muskat, L. R. (1996). Empowering students with Special Needs: Assessment and Classification Revisited. In G. Reid (Ed.), *Dimensions of Dyslexia. Volume 2: Literacy, Language and Learning* (p. 407). Edinburgh: Moray House Publications.
- [32]. Ott, P. (1997). *How to Detect and Manage Dyslexia. A Reference and Resource Manual*. London: Heinemann Educational Publishers.
- [33]. Paris, S. G., & Oka, E. R. (1986). Self-regulated learning among exceptional children. In S. H. Pierce, Learning Disabilities and Early Intervention: A Review of Theory, Research and Policy (p. 313). *Child Study Journal* 24 (4), 309-334.
- [34]. Pierce, S. H. (1995). Learning Disabilities and Early Intervention: A Review of Theory, Research and Policy. *Child Study Journal* 24(4), 309-334.
- [35]. Population and Housing Census of Malaysia (2000). Education and Social Characteristics of the Population, June 2002, Department of Statistics, Malaysia.
- [36]. Rahimah, H. A., & Norani, M. S. (1998). *Bullying and Violence in the Malaysian School*. France: UNESCO Publications.
- [37]. Raymond, S. (1997). *Helping Children Cope with Dyslexia*. London: Sheldon Press.
- [38]. Redd, Z., Brooks, J., & McGarvey, A. M. (2001). *Background for Community Level Work on Educational Adjustment in Adolescence: Reviewing the Literature and Contributing Factors*. Retrieved June 27, 2003, from www.childtrends.org/what_works/youth-development/education/+5bestbets14.asp
- [39]. Rogers, C. S., & Sawyers, J. K. (1988). Play in the lives of children. In K. S. Ralph & E. A. Eddows, *Interactions for Development and Learning: Birth through eight years*. (2nd ed., p. 113). Upper Saddle River: Pearson Education.
- [40]. Russel, J. F., Grandgenett, N. F., & Licketeig, M. J. (1994). Serving the needs of at risk students: The relationship between School Personnel Attitudes and Efforts. *The Journal of Research and Development in Education* 27, 215-216.
- [41]. Ryan, M. (1992). The social and emotional effects of dyslexia. *Education Digest* 57(5), 68-71. Retrieved August 3, 2003, from www.chapman.edu/syllabi/Education/EDUC519.DOC
- [42]. Schickedanz, J. A., Schickedanz, D. I., Forsyth P. D., & Forsyth, G. A. (1998). *Understanding Children and Adolescents* (3rd ed.). Boston: Allyn and Bacon.
- [43]. Sellkowitz, M. (1993). *Dyslexia and Other Learning Difficulties: The Facts*. Oxford: Oxford University Press.
- [44]. Serfontein, G. (1990). *The Hidden Handicap*. East Roseville: Simon & Schuster.
- [45]. Shaughnessy, J. J., Zechmeister, E. B., & Zechmeister, J. S. (2000). *Research Methods in Psychology* (5th ed.). Boston: McGraw-Hill.
- [46]. Shaywitz, S. E., Fletcher, J. M., & Escobar, M. D. (1990). *Prevalence of reading disability in boys and girls: Results of a Connecticut longitudinal study*. Retrieved June 24, 2003, from <http://www.umm.maine.edu/resources/beharchive/beh450/HollyDavis/bib.htm>
- [47]. Siegel, L. S. (1993). The cognitive basis of dyslexia. In R. Pashak & M. L. Howe (Eds.), *Emerging Themes in Cognitive Development. Volume II: Competencies* (pp. 33-52). New York: Springer-Verlag.
- [48]. Singleton, C. (1996). Computerised Screening for Dyslexia. In G. Reid (Ed.), *Dimensions of Dyslexia. Volume 1. Assessment, Teaching and the Curriculum* (pp. 111-115). Edinburgh: Moray House Publications.
- [49]. Sixth Malaysia Plan, 1991-1995 (1991). Kuala Lumpur: Government Press.
- [50]. Skiba, R. (2003). *Facts about school violence*. Retrieved June 27, 2003, from <http://www.indiana.edu/~safeschl/facts.html>
- [51]. Thomson, P., & Gilchrist, P. (1997). *Dyslexia. A multidisciplinary approach*. London: Chapman & Hall.
- [52]. Twine, S. J. Y. (1991). *Learning Disability: Practical Help*. South Perth: The Dyslexia Research Foundation of Australia.
- [53]. Unger, K. (1978). Learning disabilities and juvenile delinquency. In A. Ariel, *Education of Children and Adolescents with Learning Disabilities* (p.57). New York: MacMillan Publishing.

- [54]. Verma, M.A., & Campbell, J.R. (2003). *The effects on Home Environment on Academic Achievement*. Retrieved June 23, 2003, from <http://www.ncela.gwu.edu/Pathways/asian/gifted.htm>
- [55]. Vogel, S. A., & Walsh, P. C. (1987). Gender differences in cognitive abilities of learning-disabled females and males. *Annals of Dyslexia* 37, 142-165. Retrieved July 13, 2003, from <http://student.admin.utas.edu.au/services/options/gender.htm>
- [56]. Vygotsky, L. S. (1986). Thought and Language. In P. Eggen & D. Kauchek, *Educational Psychology. Windows on Classrooms* (4th ed., pp. 6-7). Upper Saddle River: Prentice-Hall.
- [57]. Vygotsky, L. S. (1978). Mind in Society: The Development of Higher Psychological Processes. In P. Eggen & D. Kauchek, *Educational Psychology. Windows on Classrooms* (4th ed., pp. 6-7). Upper Saddle River: Prentice-Hall.
- [58]. Vygotsky, L. S. (1963). Learning and mental development at school age. In K. Devereux, *Understanding Learning Difficulties* (p.6). Milton Keynes: Open University Press.
- [59]. Vygotsky, L. S. (1935). The Problem of the Environment.. In R. van der Veer & J. Valsiner, *The Vygotsky Reader* (p. 353). Oxford: Blackwell.
- [60]. Vygotsky, L., & Luria, A. (1934). Tool and symbol in child development. In R. van der Veer & J. Valsiner, *The Vygotsky Reader* (pp. 106-115). Oxford: Blackwell.
- [61]. Vygotsky, L. S. (1925). Social Education for Deaf and Dumb Children. In R. van der Veer & J. Valsiner, *The Vygotsky Reader* (pp. 19-22). Oxford: Blackwell.
- [62]. Webster, A., & McConnel, C. (1987). *Special Needs in Ordinary Schools*. London: Cassell Educational.
- [63]. Wood, D. (1988). *How Children Think & Learn*. Oxford: Blackwell.